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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,331

09/19/2006

Shinzou Hayashi

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12/27/2007

OLIFF & BERRIDGE, PLC

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EXAMINER

HOBAN, MATTHEW E

ART UNIT

PAPER NUMBER

4116

MAIL DATE

DELIVERY MODE

12/27/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/593,331	HAYASHI ET AL.	
	Examiner	Art Unit	
	Matthew E. Hoban	4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
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| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/19/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status

Claims 1-20 are currently pending and presented for examination

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "substantially" in claim 12 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is currently unclear to what degree larger particles of over 100 microns can be included in the invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 4116

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beall et al in US6541407 in view of Swanson et al in US5976478.

Art Unit: 4116

Beall teaches a method for forming a cordierite porous body, comprising at least Si as a chemical component. This body is formed by mixing quartz with a source of talc, alumina and kaolin, as well as methyl cellulose. These chemicals are kneaded together and then extruded in the form of a honeycomb structural body. The formed mass is then dried and fired. The structure of Beall is said to be useful as a diesel particulate filter (see Abstract).

The difference between the instant claims and the teaching of Beall arise from the silicon source used in forming the structural body. Beall uses quartz, where the instant claims use amorphous silica gel with distinct properties regarding its pore and particle size distribution; however, this difference is resolved by Swanson, who teaches the use of a stringently tested silica particulate, which has high porosity. Due to the porosity of this silica, Swanson deems it as useful in catalyst monoliths (where a honeycomb particulate filter is a well known monolith). The use of Swanson's porous silica would enhance the porosity of the already porous monolith, increasing its usefulness. One of ordinary skill in the art of making particulate filters would readily see the motivation in using any of the silica powders (whether Inventive or Comparative) to make a better ceramic porous body.

In reference to Claims 1-3 and 7-8: Beall discloses a ceramic porous body comprising 12.32-22.04 wt % silica, alumina, kaolin, talc and methyl cellulose (**Relevant to Claim 7**). This composition was mixed thoroughly and then extruded into a honeycomb

Art Unit: 4116

structure, and subsequently dried and fired at 1400+ degrees Celsius (See Column 8, lines 43-64; **Relevant to Claim 8**). It is interesting to note that the compositions and ratios of precursors used by Beall in his Inventive and Comparative Examples in Tables B, C and D, as well as the processing conditions outlined are extremely similar in all respects to that of the instant specifications. It is noted that the examples as outlined in Column 8 of Beall that the final product is of cordierite, meaning that the silica (quartz) was melted in the process and formed cordierite. Seeing that cordierite was formed (**Relevant to Claim 3**) from precursors, which didn't include cordierite, several of the components had to have melted to form cordierite (**Relevant to Claim 2**). However, as stated above the silica containing component powder of Beall is not a porous silica-containing compound powder. As stated above it would have been obvious to replace the quartz powder, with the porous silica powder of Swanson, to increase the porosity of the composition (**Relevant to Claim 1**).

In reference to Claims 4-6: The powder of Swanson, which would have been an obvious replacement for the quartz of Beall's composition has very refined structure and particle size. This silica, which can be found in Tables 1 and 3, is amorphous in nature, porous, and has a density of .35 to .83 g/cc.

In reference to Claims 9, 10, 14-15: The instant claims are directed towards a ceramic porous body comprising a Si chemical component, wherein, the silica in this scenario is added in the form of silica gel. However, the powder of Swanson, which is used to

Art Unit: 4116

replace the quartz of Beall, is deemed to be structurally synonymous with silica gel.

This is due to the fact that silica gel is characterized by being a highly porous silica powder with a high surface area. Thus the powder of Swanson is synonymous with the instantly claimed silica gel, which is an obvious improvement over the quartz powder used by Beall. Furthermore, as was stated before the powder of Swanson is structurally equivalent to the instantly claimed silica gel, which is supported by the fact that the properties of both powders are the same. More specifically Swanson's powders A, C and D found in Table 1 and 3 has a D10/D50 and D90/D50 ratio falling within the ranges recited in **Claim 10**, in Swanson's Disclosure D16 and D84 are recorded rather than D10 and D90; however, particles at D10 are smaller than those at D16 as particles at D84 are smaller than D90 meaning that the ratios of these measurements would still fall well within the limits of the ratios as claimed. All of Swanson's example powders also have a D50 particle size between 10 and 100 microns (**Relevant to Claim 9**).

Furthermore, powders A and B also have BET specific surface area of 221 and 382 m²/g, respectively (**Relevant to Claim 14**). Lastly, it was stated by Swanson that the particles only contain trace amounts of Boron and no other major inconsistencies are mentioned in the silica particles. Due to the fact that Boron is non-metallic, it is of no relevance to the claims, and the particles of Swanson inherently have less than 5% metal impurities relative to the Silica (See Column 4, lines 29-38; **Relevant to Claim 15**).

In reference to Claims 11-12: The particles of Swanson are not investigated as far as their geometry is concerned, but it is believed that they would have been spherical or nearly spherical based on the fact that they were created from a normal commercially available powder. Furthermore, if the aspect ratio of the particles were greater than 5, the measurement of the particle diameters would have been very different and would have seen a much greater range. This is due to the fact that the particles were measured by laser light scattering. If the aspect ratio was very high, this method would have given a much broader range of results due to the fact that the major and minor axis would be included in the calculation (See Table 1). Lastly, in relation to Claim 12 it can be seen in Table 1 that the maximum particle size was 105 microns, where 84% of the particles were under 31 or 23 microns in either case. This means that very few of the particles were over 100 microns. This means that the powder does not substantially include particles greater than 100 microns in diameter.

In reference to Claims 13-14: The comparative examples of Swanson are also structurally synonymous with silica gel, as they have high porosity and pore volume. For this reason, they would be equally suitable in a porous ceramic body. These comparative powders have pore volumes of .55 -1.12 cc/g and surface areas between 195.8-552 cubic meters per gram (See Table 2 in Column 8). These powders as stated by structurally synonymous to silica gel and one of ordinary skill in the art would have viewed them as obvious improvements over the non-porous quartz as used by Beall.

In reference to Claims 16-18: The porous silica made by Swanson is stated as being filtered after creation (Column 6, Lines 22-28); however the filtering process isn't described to a great extent and the pores in the filtering paper are not disclosed. The claim language including this filtering step is deemed to be product-by-process language. In the case of the instant claims, the product as claimed is deemed to be the same product as that of Beall in view of Swanson. The particle size distribution and the ratios as claimed are the same as the powder as taught by Swanson. For this reason, the claim language does not give any patentable distinction, as Swanson's particles are still filtered or sieved and the final product is the same as the claimed powder.

In reference to Claims 19-20: The claims outline a method for producing a ceramic porous body after firing, where the method comprises adding silica gel granules or silica gel granules and water-absorbing polymer particles to a forming raw material to prepare a clay, and integrally forming the resulting ceramic clay into a formed product through a continuous forming machine.

Beall teaches a method for forming a cordierite porous body, comprising at least Si as a chemical component. This body is formed by mixing quartz with a source of talc, alumina and kaolin, as well as methyl cellulose (water absorbing polymer). These chemicals are kneaded together and then extruded in the form of a honeycomb

Art Unit: 4116

structural body. The formed mass is then dried and fired. The structure of Beall is said to be useful as a diesel particulate filter (see Abstract).

The difference between the instant claims and the teaching of Beall arise from the silicon source used in forming the structural body. As has been stated extensively throughout this rejection, the silica source of Beall could be replaced with that of Swanson, which is structurally synonymous to a silica gel and as thus are interchangeable.

Conclusion

All claims are rejected

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 4116

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

meh
/Vickie Kim/
Supervisory Patent Examiner, Art Unit 4116